

A Facility for Use Of Radioactive Isotopes In a General Hospital

GENERAL HOSPITALS more and more are becoming a point of use of radioactive isotopes for certain clinical tests and for treatment of selected patients. The unique characteristics of radioactive substances as employed in medical practice make necessary the planning and development of a special area to accommodate their use in the general hospital.

Based on established knowledge of the hazards associated with the use of radioactive isotopes, and on current experience in operating units, the Public Health Service, in cooperation with the Atomic Energy Commission and other authorities, has developed guide material for use in designing a radioactive isotope area in a general hospital.

Plan of the Area

The minimum, basic, adequate facility for use of radioactive isotopes in the hospital consists of two rooms: a radiochemistry laboratory and a patient uptake-measuring room (see plan on page 450).

In the radiochemistry laboratory, the shipments of radioactive isotopes are received and stored and the proper dilutions for patient dosage are prepared. Here also, clinical specimens are prepared for examination, the doses of isotopes are given to patients, and glassware, linens, clinical specimens, and other items contaminated with radioactive isotopes are cleaned,

The guide material was developed by W. R. Taylor, hospital architect, Division of Hospital Facilities, and Samuel C. Ingraham, M. D., Division of Engineering Resources, Public Health Service. Technical details are given in the December 1952 issues of Hospitals (p. 74) and Architectural Record (p. 181).

held for decay of radioactivity, or stored prior to disposition.

The plan incorporates such elementary design features as: equipment located on the side walls, permitting window space with heating outlets below; separate work tops for patient dose and clinical specimen preparation: high level radiation area and isotope storage (see "hoods 7" and "13" on drawing) on an outside wall, far removed from radiation measurement area; separation from patient uptake-measuring room by a corridor to minimize disturbance of radiation measurements caused by storage of stock solutions of radioactive isotopes.

In the patient uptake-measuring room, the radioactive content of clinical specimens is determined and the patient uptake of radioactive substance is measured. The room is divided into three areas: waiting, clerical, and clinical.

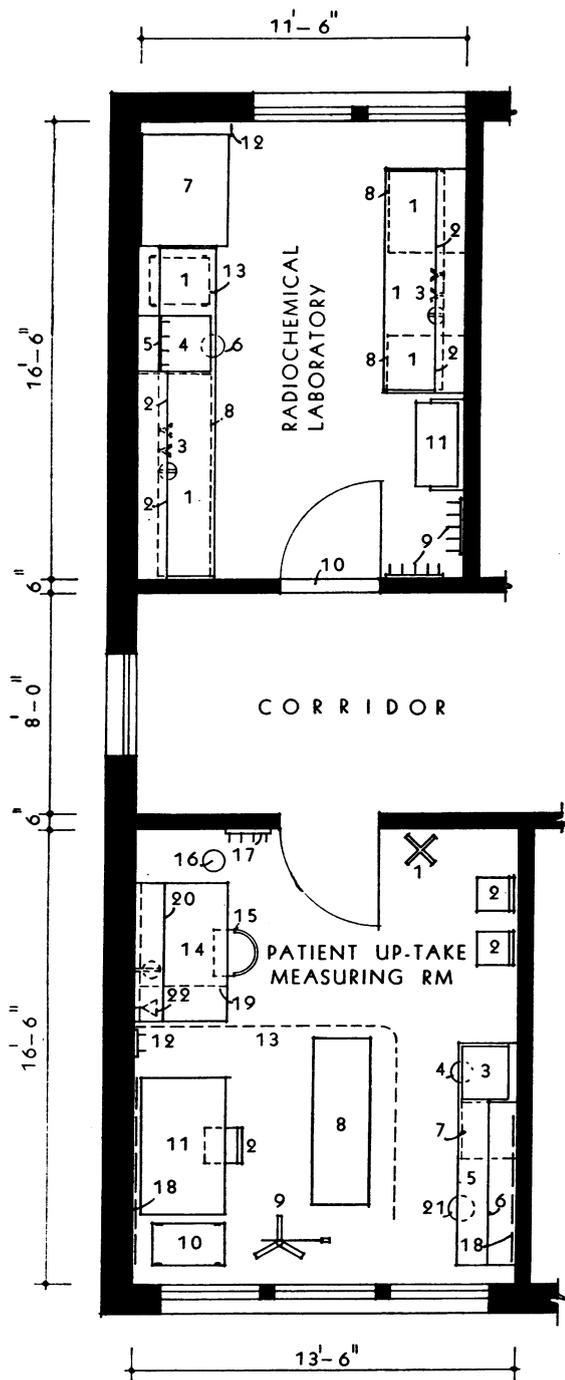
This basic, 2-room facility should provide for a patient load of about 60 patients a month. On the assumption that not more than 2 or 3 patients are receiving radioactive gold-198, it is equipped for a maximum of 10 patients in a working day.

As the use of radioactive isotopes will probably increase, the hospital should plan for economical expansion of the isotope area. By adding a second patient uptake-measuring room, the hospital can double the patient capacity of this basic facility.

Design and Operation

Design and construction of the radioactive isotope area must provide for necessary radiation shielding to maintain personnel exposures below 0.3 roentgen a week, for preparation of patient doses of isotopes, for ease of cleanup whenever radioactive material is accidentally spilled, and for measurement of the patient's absorption of isotopes.

In operating radioactive isotope facilities, continued vigilance is necessary to protect personnel against excessive radiation exposures and to assure that work areas are free from contamination. Personnel exposures should be monitored by use of film badges or pocket radiation dosimeters to be worn at all times the individual is in the area. Work areas should be



Radiochemical Laboratory

1. Work top with splash back.
2. Wall cabinets.
3. Air, gas, and electric outlets.
4. Sink, foot, knee, or elbow controls for hot and cold water, plus one cold-water hand-controlled outlet.
5. Peg board.
6. Contaminated waste receptacle under sink.
7. Fume hood.
8. Cabinets below.
9. Hook strip.
10. Bright yellow flush threshold to indicate radiation hazard zone.
11. Paper-roll holder 48 inches above floor.
12. Metal closure plate.
13. Isotope storage below work top, on dolly.

Patient Uptake-Measuring Room

1. Counter.
2. Straight chair.
3. Sink, foot, knee, or elbow controls.
4. Contaminated waste receptacle.
5. Work top.
6. Wall cabinets.
7. Cabinet below work top 24 inches wide.
8. Examination table.
9. Tube stand on casters.
10. Dolly.
11. Table.
12. Hook strip for patients' clothes.
13. Curtain rod and curtain.
14. Stenographer's desk.
15. Stenographer's chair.
16. Waste paper receptacle.
17. Hook strip for staff.
18. Constant voltage plug-in strip.
19. Record file.
20. Book shelf above desk.
21. Stool.
22. Telephone outlet.

monitored regularly by use of radiation survey instruments suitable for detecting possible contamination of furniture, walls, and floors.

Hospitals planning the use of radioactive isotopes for the first time should consult the

Isotopes Division of the Atomic Energy Commission, Oak Ridge, Tenn., to learn the requirements and regulations governing qualification for use of radioactive isotopes for human applications.